

Claims:

1. A method for delivering multimedia data from a transmitter to each of a plurality of receivers through a network, comprising the steps of:

at the transmitter,

5 a) delivering real-time multimedia data in multicast to the receivers while storing the real-time multimedia data into a first memory;

10 b) when having received a time-shift transition command from a receiver, reading time-shifted multimedia data from the first memory depending on the time-shift transition command;

15 c) transmitting the time-shifted multimedia data in unicast to the receiver which originated the time-shift transition command;

at the receiver,

20 d) receiving the real-time multimedia data in multicast from the transmitter before transmitting the time-shift transition command; and

e) receiving the time shifted multimedia data in unicast from the transmitter after transmitting the time-shift transition command.

2. The method according to claim 1, wherein the step

a) comprises:

adding a time stamp to each transmission block size
of the real-time multimedia data;

storing the real-time multimedia data with time
5 stamps into the first memory; and

delivering the real-time multimedia data with time
stamps to the receivers.

3. The method according to claim 2, further comprising
the steps of:

10 at each of the receivers,

creating a thumbnail picture from the
real-time multimedia data received from the transmitter each
time an amount of real-time multimedia data per unit time exceeds
a predetermined level; and

15 storing thumbnail pictures with corresponding time
stamps into a second memory so as to designate a desired thumbnail
picture, allowing a desired location of the real-time multimedia
data to be designated.

4. The method according to claim 3, further comprising
20 the steps of:

when a time-shift request occurs, creating a
time-shift transition command based on the thumbnail pictures
with the corresponding time stamps stored in the second memory;
and

Transmitting the time-shift transition command to the transmitter so as to receive time-shifted multimedia data from the transmitter in unicast.

5. The method according to claim 1, wherein the time shift transition command is one of a replay start location designation command, a pause command, a reverse command, a slow-replay command, and a fast-forward command.

6. The method according to claim 1, further comprising the steps of:

10 at each of the receivers,
storing the real-time multimedia data received from the transmitter into a third memory; and
when a time-shift request occurs, reading
time-shifted multimedia data from the third memory depending
15 on the time-shift request.

7. The method according to claim 1, further comprising the steps of:

at the transmitter,
managing a delivery status including a transmission
20 status, a transmission mode, and time information for each of the receivers.

8. A method for delivering multimedia data from a

transmitter to each of a plurality of receivers through a network, comprising the steps of:

when having received a start request command from a receiver, the transmitter delivering real-time multimedia data in multicast to the receiver while storing the

- 5 data in first memory;

when having received a time-shift transition command from the receiver, reading time-shifted multimedia data from the first memory depending on the time-shift transition

- 10 command, to transmit the time-shifted multimedia data in unicast to the receiver which originated the time-shift transition command; and

when having received a termination request command from the receiver, the transmitter terminating multimedia data delivery to the receiver.

9. A system for delivering multimedia data from a transmitter to each of a plurality of receivers through a network, wherein

the transmitter comprises:

- 20 an input section for inputting real-time multimedia data;

a multicast transmitter for transmitting the real-time multimedia data to each of the receivers;

a first unicast transceiver for receiving a command from a receiver and transmitting a response to the receiver;

- 25 a command analyzer for analyzing a command received from

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the receiver to determine a type of the received command;

a first memory for storing the real-time multimedia data;

and

a first controller controlling the multicast transmitter,

5 the unicast transceiver and the first memory, such that the real-time multimedia data is delivered in multicast to each of the receivers while storing the real-time multimedia data into the first memory, wherein, when having received a time-shift transition command from a receiver, time-shifted multimedia 10 data is read from the first memory depending on the time-shift transition command and is transmitted in unicast to the receiver which originated the time-shift transition command, and

each of the receivers comprises:

a multicast receiver for receiving the

15 real-time multimedia data from the transmitter;

a second unicast transceiver for transmitting a command to the transmitter and receiving a response to the command from the transmitter; and

a second controller controlling such that the

20 real-time multimedia data is received in multicast from the transmitter before transmitting the time-shift transition command, and the time-shifted multimedia data is received in unicast from the transmitter after transmitting the time-shift transition command.

25 10. The system according to claim 9, wherein the first

controller adds a time stamp to each transmission block size of the real-time multimedia data, stores the real-time multimedia data with time stamps into the first memory, and delivers the real-time multimedia data with time stamps 5 to the receivers.

11. The system according to claim 10, wherein each of the receivers further comprises a second memory, wherein the second controller creates a thumbnail picture from the real-time multimedia data received from the transmitter each 10 time an amount of real-time multimedia data per unit time exceeds a predetermined level, and stores thumbnail pictures with corresponding time stamps into the second memory so as to designate a desired thumbnail picture, allowing a desired location of the real-time multimedia data to be designated.

15 12. The system according to claim 11, wherein when a time-shift request occurs, the second controller creates a time-shift transition command based on the thumbnail pictures with the corresponding time stamps stored in the second memory, and controls the second unicast transceiver to transmit the 20 time-shift transition command to the transmitter so as to receive time-shifted multimedia data from the transmitter.

13. The system according to claim 9, wherein each of the receivers further comprises a third memory, wherein the

second controller stores the real-time multimedia data received from the transmitter into the third memory and, when a time-shift request occurs, reads time-shifted multimedia data from the third memory depending on the time-shift request.

5 14. The system according to claim 9, wherein the first controller manages a delivery status including a transmission status, a transmission mode, and time information for each of the receivers.

10 15. A transmitter for delivering multimedia data to each of a plurality of receivers through a network, comprising:
 an input section for inputting real-time multimedia data;
 a multicast transmitter for transmitting the real-time multimedia data to each of the receivers;
15 a unicast transceiver for receiving a command from a receiver and transmitting a response to the receiver;
 a command analyzer for analyzing a command received from the receiver to determine a type of the received command;
 a memory for storing the real-time multimedia data;
20 and
 a controller controlling the multicast transmitter, the unicast transceiver and the memory, such that the real-time multimedia data is delivered in multicast to each of the receivers while storing the real-time multimedia data

into the memory, wherein, when having received a time-shift transition command from a receiver, time-shifted multimedia data is read from the memory depending on the time-shift transition command and is transmitted in unicast to the receiver

5 which originated the time-shift transition command.

16. A receiver for receiving multimedia data from a transmitter through a network, comprising:

a multicast receiver for receiving real-time multimedia data from the transmitter;

10 a unicast transceiver for transmitting a time-shift transition command to the transmitter and receiving a response to the time-shift transition command from the transmitter; and

a controller controlling such that the real-time multimedia data is received in multicast from the transmitter before transmitting the time-shift transition command, and the time-shifted multimedia data is received in unicast from the transmitter after transmitting the time-shift transition command.

17. A program instructing a computer to deliver multimedia data to each of a plurality of receivers through a network, comprising the steps of:

a) delivering real-time multimedia data in multicast to the receivers while storing the real-time multimedia data into a memory;

b) when having received a time-shift transition command from a receiver, reading time-shifted multimedia data from the memory depending on the time-shift transition command; and

5 c) transmitting the time-shifted multimedia data in unicast to the receiver which originated the time-shift transition command.

18. A program instructing a computer to receive multimedia data from a transmitter through a network, comprising the steps of:

receiving real-time multimedia data in multicast from the transmitter;

transmitting a time-shift transition command to the transmitter; and

15 after receiving a response to the time-shift transition command from the transmitter, receiving time-shifted multimedia data in unicast from the transmitter.